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EXAMINER	
PAUL, DISLER	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/556,232	HAULICK ET AL.	
	Examiner	Art Unit	
	DISLER PAUL	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16;19-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *24-36* is/are allowed.

6)☒ Claim(s) *1-3;5-11-16;19-23* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed 8/29/08, with respect to the rejection(s) of claim(s) 1 under June et al. in regard to the " processing the input signal by a beamformer" have been fully considered and is non-persuasive.

Junes indeed disclose of a plurality of array wherein the input signals are processed by such a beamformer (fig.5A; par [0046-0048; 0054]/input signals with time-delay are summed for sound directivity denote such a beamforming (under the broad definition of the term) as in a delay and summed of the two signals resulting a new wave pattern of the signals for processing and thus, resulting of a maximum resulting in the maximum sensitivity of the process toward the preferred direction and thus enhanced reception of the signals).

In regard to claims 16, 21, the applicant's argument of the art teach away from that of June art has been analyzed and is non-persuasive; it is noted that june et al. (US 2003/0185410 A1) disclose of a sensor/microphone for speaker/listener to be used in a conference (par [0007]).

In that regard it is noted, it should be seen that the concept of having the output to provide processed output signals to at least two loudspeakers (from such sensors/microphones) as originated and being disclosed by Roddy, which enables

the passenger in a vehicle to hear the speech of the drivers or others in the other seating area to be reproduced.

However, upon further analysis a new ground rejection is made in regard to claim 3, thus, this office action is made non-final.

Allowable Subject Matter

2. Claim 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Re claim 4, none of the prior art of record disclose of the specific wherein deciding comprising deciding comprises determining a wanted signal power and a blocking signal power, wherein the wanted signal beamformer is adapted only if the blocking signal power is larger than a predetermined constant times the wanted signal power.

Claims 24-36 are allowed.

Similarly, in regard to independent claims (24,34); None of the prior art of record disclose of the specific determining temporal and spatial information about the

input signals of each microphone array; and deciding whether a signal is transmitted from a wanted signal direction, the deciding comprising: determining a wanted signal power; and determining a blocking signal power, wherein the adaptive wanted signal beamformer is adapted only if no signal is transmitted from the wanted signal direction, which is determined as when the blocking signal power is larger than a predetermined constant times the wanted signal power.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 5; 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by June et al. (US 2003/0185410 A1).

Re claim 1, June et al. disclose of the Method for enhancing communication in a noisy environment comprising: receiving input signals emanating from at least two microphone arrays each comprising at least two microphones (fig.3(201,202); par[0029]/as in array of

microphones) and processing the input signals of each microphone array by a beamformer to determine temporal and spatial information about the input signals of each microphone array(fig.3,(304, 201); par[0037 ,0039,0040,0042, 0046-0048,0032]/the only one microphone array (201) determined location of person in XY dimension as well as the temporal time info and as fig.3 (202) to help estimate the three dimensions of speaker and for efficiency each microphone array with fig.3 (308) may be used (par[0072]; fig.7).

Re claim 5, the method according to one of the preceding claims, further comprising detecting speech activity for each microphone array (par [0042]).

Re claims 14-15 have been analyzed and rejected in view of claim 1.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-3, 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over June et al. (US 2003/0185410 A1) and further in view Yang et al. (US 7,206,418 B2).

Re claim 2, the method according to claim 1 with processing each array of input signal with beamformer, however, June et al. fail to disclose of wherein processing the input signals of each microphone array comprises processing by a wanted signal beamformer to obtain a wanted signal and by a blocking beamformer to obtain a blocking signal, preferably wherein the wanted signal beamformer is an adaptive beamformer, But, Yang et al. disclose of a system of beamforming wherein the processing the input signals of each microphone array comprises processing by a wanted signal beamformer to obtain a wanted signal and by a blocking beamformer to obtain a blocking signal, preferably wherein the wanted signal beamformer is an adaptive beamformer (fig.2 wt (212); fig.3; col.5 line 1-37). Thus, it would have been obvious for one of the ordinary skill in the art to have modify June et al. with the processing the input signals of each microphone array comprises processing by a wanted signal beamformer to obtain a wanted signal and by a blocking beamformer to obtain a blocking signal, preferably wherein the wanted signal beamformer is an adaptive beamformer for purpose of suppressing noise signal included in the speech signal array.

Re claim 3, the method according to claim 2, further comprises deciding whether a signal is transmitted from a wanted signal direction (June; par [0047-0048]/to determined the signal direction);

While, the combined teaching of June et al. and Yang et al. as whole, disclose of the wanted signal beamformer is an adaptive beamformer being adapted only at a certain times (col.5 line 50-60/adaptive filter to determined **appropriate time** for doing adaptations). But, the combined teaching of June et al. and Yang et al. as whole, fail to disclose of the specific wherein the wanted signal beamformer is an adaptive beamformer being adapted only if no signal is transmitted from the wanted signal direction.

But, it is noted the concept of having the specific wherein the wanted signal beamformer is an adaptive beamformer being adapted only if no signal is transmitted from the wanted signal direction is merely an obvious variation of the designer's choice based on his need (since adaptive filter may only be adaptively done at appropriate times). Thus, it would have been obvious to have modified the above with having the wanted signal beamformer is an adaptive beamformer being adapted only if no signal is transmitted from the wanted signal direction in similarly suppressing noise form a speech signal.

Re claim 6, the method according to claim 5, But, June et al. fail to disclose of the specific wherein detecting speech activity for a microphone array comprises determining a wanted signal power, a blocking signal power, and a background noise signal power comparing the wanted signal power with the blocking signal power
and the background noise signal power. But, Yang et al. disclose of a

system wherein detecting speech activity for a microphone array comprises determining a wanted signal power, a blocking signal power, and a background noise signal power comparing the wanted signal power with the blocking signal power and the background noise signal power (col.8 line 30-50/wanted and all noise power spectrums include background). Thus, taking the combined teaching of June et al. and Yang et al. as a whole, it would have been obvious for one of the ordinary skill in the art to have modified June et al. with the detecting speech activity for a microphone array comprises determining a wanted signal power, a blocking signal power, and a background noise signal power comparing the wanted signal power with the blocking signal power and the background noise signal power for enabling the device to adapt at the appropriate times.

RE claim 7, the method according to claim 6, wherein determining the wanted signal power with the microphone array (fig.3a; fig.2 (232a)/wanted signal power is determined), But, the combined teaching of June et al. and Yang et al. as a whole, fail to disclose of the specific wherein comparing the signal power of at least two microphone arrays and determining the highest power. But, the concept of comparing the signal power of at least two microphone arrays and determining the highest power is simply the designer's need. Thus, it would have been obvious for one of the ordinary skill in the art to have modified June et al. and Yang et al. as a whole, with such comparing the signal power of at least two microphone arrays and

determining the highest power for enabling the best speech signals to adapt during period of speech activity.

Re claim 8, the method according to claim 5,but, June et al. fail to disclose of the specific wherein applying an attenuation to the processed input signals of a microphone array if no speech activity is detected for the microphone array. But, Yang et al. disclose of system wherein applying a scaling to the processed input signals of a microphone array if no speech activity is detected for the microphone array (fig.2 wt (236); col.8 line 20-35). Thus, taking the combined teaching of June et al. and Yang et al. as a whole, it would have been obvious for one of the ordinary skill in the art to have modified June et al. with the applying a scaling to the processed input signals of a microphone array if no speech activity is detected for the microphone array for purpose of obtaining a better estimate of the spectrum of the signal.

While, the combined teaching of June et al. and Yang et al. as a whole, disclose of the scaling the processed signals. But, they fail to disclose of the specific wherein applying an attenuation to the signals. But, applying an attenuation the signals is the designer's need, thus it would have been obvious for one of the ordinary skill in the art to have modified the combined teaching of June et al. and Yang et al. as a whole, with having the attenuation to the input processed signals for obtaining the sound spectrum.

Re claim 9, the method according to claim 8, wherein applying the attenuation is performed adaptivety, But, the combined teaching of June et al. and Yang et al. as a whole, fail to disclose of such wherein preferably by varying the attenuation in predetermined time steps between zero attenuation and a predetermined maximum attenuation. But, the concept of wherein preferably by varying the attenuation in predetermined time steps between zero attenuation and a predetermined maximum attenuation is simply the designer's preference. Thus, it would have been obvious for one of the ordinary skill in the art to have modified June et al. and Yang et al. as a whole, with such wherein preferably by varying the attenuation in predetermined time steps between zero attenuation and a predetermined maximum attenuation for obtaining a better estimate of the spectrum of the signal.

Re claim 10, the method according to one of the preceding claims claim 1, wherein processing comprises determining a gain control of the input signals for each microphone array(see claim 8).

Re claim 11, the method according to claim 10, wherein determining a gain control is performed adaptively (see claim 8).

7. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over June et al. (US 2003/0185410 A1).

Re claim 12, the method according to claim 1, but, June et al. fail to disclose of the specific of further comprising selecting at least one output channel out of at least two output channels on which the processed signals are to be output. but, official notice is taken having the selecting at least one output channel out of at least two output channels on which the processed signals are to be output is well known in the art. Thus, it would have been obvious for one of the ordinary skill in the art to have modified June et al. with incorporating the selecting at least one output channel out of at least two output channels on which the processed signals are to be output for enabling the receipt of such sound processed signals.

Re claim 13, the method according to claim 12, but, June et al. fail to disclose of the specific of further wherein selecting the at least one output channel comprises determining an amplification for each selected output channel. But, official notice is taken having specific of further wherein selecting the at least one output channel comprises determining an amplification for each selected output channel is well known in the art. Thus, it would have been obvious for one of the ordinary skill in the art to have modified June et al. with incorporating the specific of further wherein selecting the at least one output channel comprises determining an amplification for each selected output channel for enabling the receipt of such sound processed signals.

8. Claims 16; 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over June et al. (US 2003/0185410 A1) and Roddy (US 6,363,156) and Yang et al. (US 7,206,418 B2)

Re claim 16, June et al. disclose of the Communication system comprising: at least two microphone arrays each comprising at least two microphones to produce microphone signals, at least one analog/digital converter having an input for receiving said microphone signals and an output for providing digital microphone signals (fig.3 (301; 310); par[0037])), digital signal processing means having an input for receiving the digital microphone signals, being configured to process the digital microphone signals of each microphone array by a beamformer to determine temporal and spatial information about the microphone signals of each microphone array(and having an output to provide processed output signals determined location of person in XY dimension as well as the temporal time info and as fig.3 (202) to help estimate the three dimensions of source) and having an output to provide processed output signals (fig.3 (320); par[0038]).

However, June et al. fail to disclose of the specific wherein the processed output signals to at least two loudspeakers. But, Roddy disclose of a spatial enhancement audio with microphone input signal system wherein the processed output signals to at least two loudspeakers (fig.1-2 wt (30,34); col.2 line 35-65). Thus, taking the

combined teaching of June et al. and Roddy as a whole, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify June et al. with the processed output signals to at least two loudspeakers for the purpose of enabling the passenger in a vehicle to hear the speech of the drivers or others in the other seating area to be reproduced.

The combined teaching of June et al. and Roddy as a whole, further disclose of the where the digital signal processing means is further configured to detect speech activity through each microphone array (par [0038-0040]/speech to be detected by sensor microphone).

But, the combined teaching of June et al. and Roddy as a whole, fail to disclose of the specific where the digital signal processing means is further configured to determine and apply an attenuation to the processed digital microphone signals of one of the microphone array if no speech is detected by that microphone array. But, Yang et al. disclose of system wherein applying a scaling to the processed input signals of a microphone array if no speech activity is detected for the microphone array (fig.2 wt (236); col.8 line 20-35). Thus, taking the combined teaching of June et al. and Roddy and Yang et al. as a whole, it would have been obvious for one of the ordinary skill in the art to have modified June et al. with the applying a scaling to the processed input signals of a microphone array if no speech

activity is detected for the microphone array for purpose of obtaining a better estimate of the spectrum of the signal.

While, the combined teaching of June et al. and Roddy and Yang et al. as a whole, disclose of *the scaling* the processed signals. But, they fail to disclose of the specific wherein applying an attenuation to the signals. But, applying an attenuation the signals is merely the designer's choice based on his need, thus it would have been obvious for one of the ordinary skill in the art to have modified the combined teaching of June et al. and Yang et al. as a whole, with having the attenuation to the input processed signals for obtaining the sound spectrum.

Re claim 19, the communication system according to claim 16, wherein the digital signal processing means is further configured to select at least one loudspeakers out of the at least two loudspeakers on which the processed signals are to be output (col.3 line 1-5 & line 14-16/signals from microphones to appropriate/selected speakers).

Re claim 20, a vehicle cabin comprising a communication system according to one of the claims 16 or 19, and at least two loudspeakers, wherein each microphone array and each loudspeaker is associated with a passenger seat (Roddy, fig.1, col.2 line 40-50).

Re claim 21 which is a broader claim limitation of claim 16, has been analyzed and rejected with respect to such claim 16.

Re claim 22, the communication system according to claim 21, where the spatial information includes spatial information about a plurality of signal sources (par [0011, 0014]/plurality of sound sources locations for spatial info to be determined).

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over June et al. (US 2003/0185410 A1) and Roddy (US 6,363,156) and Yang et al. (US 7,206,418 B2) and Higuchi et al. (US 5,721,771).

Re claim 23, the communication system according to claim 21 with the digital processing, But, the combined teaching of June et al. and Yang et al. and Roddy as a whole, fail to disclose of wherein the processing means is further configured to detect and overdrive that reduce feedback effects. But, Higuchi et al. disclose of a system wherein such concept of processing means is further configured to detect and overdrive that reduce feedback effects (fig.1 wt (11); col.6 line 11-22; col.5 line 55-63). Thus, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modified the combined teaching of June et al. and Yang et al. and Roddy as a whole, with incorporating the system wherein such concept of processing means is further configured to detect and

overdrive that reduce feedback effects for purpose completely eliminating acoustic echo for improving speech signal.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Disler Paul whose telephone number is 571-270-1187. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. P./
Examiner, Art Unit 2614

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